

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-063516

(43)Date of publication of application : 05.03.2003

(51)Int.Cl. B65D 1/02  
B65D 1/40

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## (54) SYNTHETIC RESIN CONTAINER

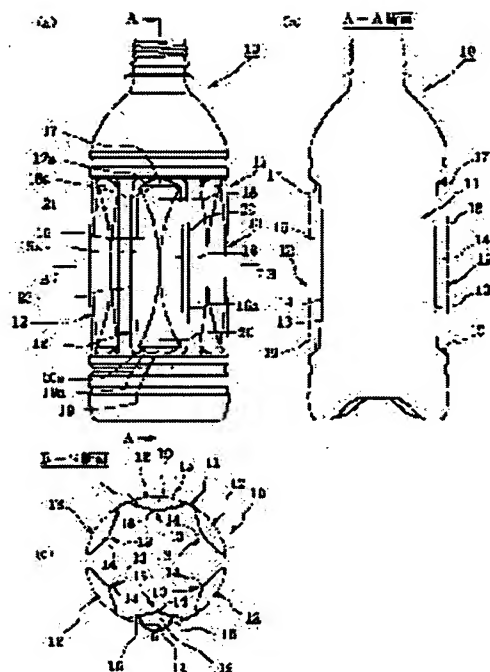
### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a synthetic resin container, which can smoothly absorb deformation caused upon pressurization or depressurization of the container, so that a permanent deformation is not caused on the container even if its weight is reduced.

**SOLUTION:** If the shapes of depressurization absorbing parts of the container comprise planes on which angles or lines concentrate on a certain point, the smooth move of the container is prevented.

Therefore, the depressurization absorbing parts are formed into curved planes or lines to absorb the deformation smoothly. In this connection, it is provided the constitution of the synthetic resin

container such as follows. A plurality of the depressurization absorbing parts 12 deforming elastically in response to a pressure decrease inside the container are formed on a cylindrical trunk 11 in the circumference direction in such a way that the depressurization absorbing parts 12 are recessed inward and their centers 14 are recessed in deepest. Further, respective center longitudinal sectional shapes 13 of the depressurization absorbing parts 12 is made to form a curve having the crown of the center 14 and projecting toward the inside of the trunk 11. This curved longitudinal sectional shapes having deepest recessed centers eliminate a stiff part against deformation, making it possible to smoothly absorb the deformation caused by depressurization.



## LEGAL STATUS

[Date of request for examination] 02.08.2006

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

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[Claim(s)]

[Claim 1] The container made of synthetic resin which carries out the description of coming to form in the drum section inside the central longitudinal-section configuration meet said drum section medial axis of these reduced pressure absorption section, in the shape of [ convex ] a curve by making a core into top-most vertices while denting the reduced pressure absorption section which carries out elastic deformation to the drum section which makes the shape of a cartridge with the reduced pressure produced inside to the drum section inside, arranging more than one to a hoop direction and denting the core of these reduced pressure absorption section most deeply.

[Claim 2] The container made of synthetic resin according to claim 1 characterized by constituting said reduced pressure absorption section from at least four vertical and horizontal inclined planes.

[Claim 3] The container made of synthetic resin according to claim 2 characterized by constituting the inclined plane of said right and left from two or more inclined planes, respectively.

[Claim 4] The container made of synthetic resin according to claim 2 characterized by coming to form the bottom valley line used as the boundary of these inclined planes in the shape of [ which opposed two radii ] a curve while constituting the pars basilaris ossis occipitalis of the reduced pressure absorption section from said four inclined planes of said reduced pressure absorption section.

[Claim 5] The container made of synthetic resin according to claim 3 characterized by making mostly into the same width of face the two each aforementioned inclined plane which constitutes said left dextroversion slant face.

[Claim 6] The container made of synthetic resin according to claim 4 characterized by making two radii of said bottom valley line of the pars basilaris ossis occipitalis of said reduced pressure absorption section into the radii which make the center section of the reduced pressure absorption section concerned top-most vertices.

[Claim 7] The container made of synthetic resin according to claim 2 to 6 characterized by forming a V character-like pars basilaris ossis occipitalis on said left dextroversion slant face of said reduced pressure absorption section.

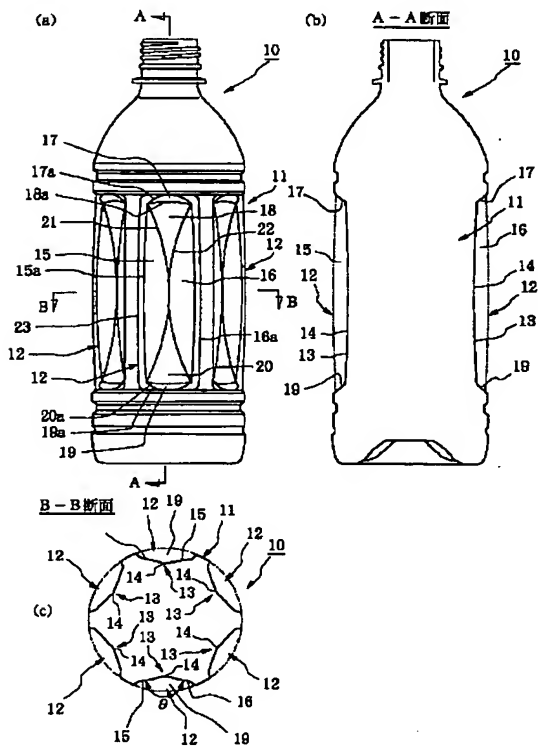

[Claim 8] The container made of synthetic resin according to claim 2 to 6 characterized by making the include angle of the pars basilaris ossis occipitalis of the shape of V character of said left dextroversion slant face of said reduced pressure absorption section into 60 - 175 degrees.

[Claim 9] The container made of synthetic resin according to claim 2 to 8 characterized by forming mutually the upper bed ridgeline of said top inclined plane, and the soffit ridgeline of said bottom inclined plane in the shape of [ of hard flow ] radii.

[Claim 10] The container made of synthetic resin according to claim 1 to 9 characterized by constituting the borderline of each inclined plane of the reduced pressure absorption section of this frame inside concerned from a curve while forming a frame in the outside of said reduced pressure absorption section.

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[Translation done.]

Drawing selection [Representative drawing] 

[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention enables it to absorb smoothly the effect of the negative pressure (reduced pressure) produced after restoration of the heated contents in the bottle-like container of polyethylene terephthalate (PET), concerning the container made of synthetic resin.

[0002]

[Description of the Prior Art] Performing after heating temperature up and biaxial stretching blow molding for preforming obtained from the former by carrying out injection molding of the preforming of an owner bottom using polyester resin, such as polyethylene terephthalate (PET), etc., and manufacturing a bottle-like container is performed, and the obtained bottle-like container is excellent in transparency, surface gloss, shock resistance, gas barrier property, etc., and is widely used as containers, such as various drinks, food, and liquid detergent.

[0003] With such a bottle-like container, even if the negative pressure accompanying the temperature lowering at the time of being filled up with the pressure accompanying restoration of contents or the heated contents etc. is added, in order to make it not spoil an appearance, forming the part which makes deformation easy is beforehand performed to the drum section of a bottle-like container, and the reduced pressure absorption section for absorbing the deformation especially accompanying reduced pressure is formed.

[0004] As there is a bottle panel wall 1 indicated by JP,63-203541,A, for example as such the reduced pressure absorption section and it is shown in drawing 5 The valley line 3 of the direction of right-and-left slant is formed in the vertical ends of the straight-line-like base line 2, the base line 2 is collapsed from a drum section 4, and the dip wall 5 of right and left between the drum sections 4 of the both sides of this base line 2, five parts and the dip wall 6 of the upper and lower sides between valley lines 3, and four dip walls of six parts are made into the variant part.

[0005] By such variant part, welding pressure is received from the interior. When the dip walls 5, 5, 6, and 6 aslant formed toward the base line 2 in the condition that the caved-in base line 2 is raised are pressed by the method of outside, and come to carry out swelling deformation and the interior is decompressed He is trying to make the dip walls 5, 5, 6, and 6 transform into the inner direction with swelling deformation with a gestalt to which the base line 2 caves in conversely in the inner direction.

[0006]

[Problem(s) to be Solved by the Invention] However, since the ends of the base line 2 serve as a point in the condition that the angle of three flat surfaces of one dip wall 6 of on between valley lines 3 or the bottom, and the (6) and the dip walls 5 and 5 of two right and left of the both sides of the base line 2 touches by one point, with such a panel wall 1, It is the point which is hard to move even if the force is added, the application of pressure especially accompanying contents restoration which cannot absorb smoothly the deformation accompanying application of pressure or reduced pressure does not restore to the original condition, while the reduced pressure absorption section had carried out swelling deformation, but there is a problem that the reduced pressure after contents restoration is smoothly unabsorbable.

[0007] Especially, with bottle-like containers, such as a PET bottle of a bevel use, the cutback of the amount of activity resin and the demand of lightweight-izing are increasing with enforcement of

recycling law, and when using much more thinning of a bottle-like container as a drawing wax, if the reduced pressure absorption section does not absorb deformation smoothly, the problem of becoming easy to produce a permanent set is also in a bottle-like container.

[0008] This invention was made in view of the technical problem which the above-mentioned conventional technique has, it can be absorbed smoothly, without spoiling an appearance for the deformation accompanying the pressure and the reduced pressure force of joining a container, and also when attaining lightweight-ization, it tends to offer the container made of synthetic resin which does not produce a permanent set.

[0009]

[Means for Solving the Problem] it be what concentrate on a point with plane angles and straight lines etc. as a result of repeat examination variously about the configuration of the reduced pressure absorption section of the container made of synthetic resin, in order to solve the above-mentioned technical problem, and cross will bar a smooth motion, and make it the configuration of the shape of the shape of a curved surface or a curve found out that it be effective in absorption of smooth deformation, and completed this invention, and that concrete configuration be as follows.

[0010] Namely, the container made of synthetic resin of this invention according to claim 1 While denting the reduced pressure absorption section which carries out elastic deformation to the drum section which makes the shape of a cartridge with the reduced pressure produced inside to the drum section inside, arranging more than one to a hoop direction and denting the core of these reduced pressure absorption section most deeply It is what carries out the description of coming to form in the drum section inside the central longitudinal-section configuration of meeting said drum section medial axis of these reduced pressure absorption section, in the shape of [convex] a curve by making a core into top-most vertices. There is no part to which it is hard to move a core with the longitudinal-section configuration of the deepest pars basilaris ossis occipitalis by the shape of a curve, and it enables it to absorb deformation by reduced pressure smoothly.

[0011] Moreover, in addition to a configuration according to claim 1, the container made of synthetic resin of this invention according to claim 2 is characterized by constituting said reduced pressure absorption section from at least four vertical and horizontal inclined planes, does not have the part which a core is deepest pars basilaris ossis occipitalis in the shape of a curve, and is moreover hard to move with the configuration of the reduced pressure absorption section of four inclined planes, and enables it to absorb deformation by reduced pressure smoothly.

[0012] Furthermore, in addition to a configuration according to claim 2, the container made of synthetic resin of this invention according to claim 3 is characterized by constituting the inclined plane of said right and left from two or more inclined planes, respectively, and enables it to absorb deformation by reduced pressure smoothly as respectively possible [inclined plane / on either side] in the smoother deformation as two or more inclined planes.

[0013] Moreover, the container made of synthetic resin of this invention according to claim 4 While constituting the pars basilaris ossis occipitalis of the reduced pressure absorption section from said four inclined planes of said reduced pressure absorption section in addition to a configuration according to claim 2 Are characterized by coming to form the bottom valley line used as the boundary of these inclined planes in the shape of [which opposed two radii] a curve, and since it is made the shape of a curve which opposed two radii, the bottom valley line of the boundary of four inclined planes Compared with a straight-line-like bottom valley line, a bottom valley line can move and deform smoothly, and deformation by reduced pressure can be more smoothly absorbed now.

[0014] Furthermore, the container made of synthetic resin of this invention according to claim 4 is characterized by making mostly into the same width of face the two each aforementioned inclined plane which constitutes said left dextroversion slant face in addition to a configuration according to claim 3, each is distributed by such inclined plane, and it can be made to deform, and can absorb deformation by reduced pressure now more smoothly.

[0015] Moreover, the container made of synthetic resin of this invention according to claim 6 is characterized by making two radii of said bottom valley line of the pars basilaris ossis occipitalis of said reduced pressure absorption section into the radii which make the center section of the reduced pressure absorption section concerned top-most vertices in addition to a configuration according to claim 4, and can absorb deformation by reduced pressure now more smoothly also by such bottom

valley line.

[0016] Furthermore, in addition to a configuration according to claim 2 to 6, the container made of synthetic resin of this invention according to claim 7 is characterized by forming a V character-like pars basilaris ossis occipitalis on said left dextroversion slant face of said reduced pressure absorption section, and can absorb deformation by reduced pressure now more smoothly also by the pars basilaris ossis occipitalis of the shape of such V character.

[0017] Moreover, the container made of synthetic resin of this invention according to claim 8 It is what is characterized by making the include angle of the pars basilaris ossis occipitalis of the shape of V character of said left dextroversion slant face of said reduced pressure absorption section into 60 - 175 degrees in addition to a configuration according to claim 2 to 6. If an include angle is too small, it is hard to deform, and if too large, it becomes impossible to make it easy to give an include angle and to transform, and shaping and deformation by reduced pressure can be more smoothly absorbed also with the include angle of such range.

[0018] Furthermore, in addition to a configuration according to claim 2 to 8, the container made of synthetic resin of this invention according to claim 9 is characterized by forming mutually the upper bed ridgeline of said top inclined plane, and the soffit ridgeline of said bottom inclined plane in the shape of [ of hard flow ] radii, and can absorb deformation by reduced pressure now more smoothly also with the configuration of such an up-and-down inclined plane.

[0019] Moreover, the container made of synthetic resin of this invention according to claim 10 While forming a frame in the outside of said reduced pressure absorption section in addition to a configuration according to claim 1 to 9 It is characterized by constituting the borderline of each inclined plane of the reduced pressure absorption section of this frame inside concerned from a curve, and enables it to absorb deformation according the reduced pressure absorption section of such the frame inside to reduced pressure more smoothly only as a curved borderline.

[0020] Here, the core of the reduced pressure absorption section says near the reduced pressure absorption section a core and near the core. Moreover, the center section of the reduced pressure absorption section says near the reduced pressure absorption section a center and near the center.

[0021] Furthermore, the pars basilaris ossis occipitalis of the reduced pressure absorption section means the base part which consists of inclined planes containing the convex curve of the core of the central longitudinal-section configuration of the reduced pressure absorption section, and though magnitude differs, it consists of an inclined plane of two right and left, or four vertical and horizontal inclined planes.

[0022]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained to a detail based on a drawing. Drawing 1 starts the gestalt of 1 operation of the container made of synthetic resin of this invention, and (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[0023] After carrying out heating temperature up of the preforming of the shape of tubing of the owner bottom obtained by carrying out injection molding of the polyethylene terephthalate (PET), consider as the bottle fabricated by carrying out drawing blow molding, and the cross-section configuration of a drum section 11 is formed in the shape of [ circular ] a cartridge, and also this container 10 made of synthetic resin is formed in the shape of [ , such as a rectangle and a polygon, ] a cartridge.

[0024] Two or more reduced pressure absorption sections 12 for making the negative pressure by the temperature lowering after filling up the drum section 11 of the bottle 10 which is such a container made of synthetic resin with the heated contents absorb, without spoiling an appearance by elastic deformation are formed in the hoop direction in the example of a graphic display at six hoop direction regular intervals.

[0025] As this reduced pressure absorption section 12 is dented and formed inside and shows the drum section 11 of a bottle 10 to drawing 1 (b), the central longitudinal-section configuration 13 is formed in the shape of [ in which the core 14 was dented most deeply ] a curve, the central longitudinal-section configuration 13 is constituted from radii with big radius of curvature here, and the core is the deepest.

[0026] Moreover, while the side-attachment-wall section and a pars basilaris ossis occipitalis on

either side consist of inclined planes 15 and 16 of two right and left as one, this reduced pressure absorption section 12 The upper and lower sides consist of inclined planes where the side-attachment-wall section differs from a pars basilaris ossis occipitalis, it consists of four inclined planes, the upside wall inclined plane 17, the raised bottom section inclined plane 18, the bottom wall inclined plane 19, and the lower base section inclined plane 20, and the reduced pressure absorption section 12 consists of a total of six inclined planes here.

[0027] In addition, the upper and lower sides can also be constituted from two inclined planes by making the side-attachment-wall section and a pars basilaris ossis occipitalis into one, and, thereby, the reduced pressure absorption section 12 can consist of inclined planes of the four minimum.

[0028] And a pars basilaris ossis occipitalis consists of this reduced pressure absorption section 12 in inclined planes 15 and 16 and the vertical pars-basilaris-ossis-occipitalis inclined planes 18 and 20 on either side. Have made the core into the configuration which opposed the convex curve mutually in the bottom valley lines 21 and 22 used as these boundaries, and make the bottom valley lines 21 and 22 into radii, and it is made for radii to have touched here at the core of the reduced pressure absorption section 12, and is made to be located in the four corners of the reduced pressure absorption section 12 in the ends of radii.

[0029] The cross-section configuration was formed in the shape of V character, the center section is dented inside the drum section 11, and, as for the left dextroversion slant faces 15 and 16 located in right and left through such radii opposed mutually, the include angle theta of a V character part is made into 60 - 175 degrees.

[0030] If the include angle theta of this V character part is smaller than 60 degrees, the mold release from metal mold will become difficult at the time of shaping, and if larger than 175 degrees, it will become near evenly, and from reinforcement falling that it is easy to swell by the pressure from the interior, it is the range of 150 - 165 degrees preferably, and may be 155 degrees here, for example.

[0031] Moreover, while each upper bed ridgeline 17a and 18a of the upside wall inclined plane 17 and the raised bottom section inclined plane 18 is made into convex-like radii Each soffit ridgeline 19a and 20a of the bottom wall inclined plane 19 and the lower base section inclined plane 20 is made into convex-like radii. The ridgeline of an upper bed and a soffit is mutually formed in the shape of [ of hard flow ] radii, and the edge of the bottom valley lines 21 and 22 located in the four corners of the reduced pressure absorption section 12 and the edge of these ridgelines cross at one point, as shown in drawing 1 (a).

[0032] Furthermore, the frame 23 of the rectangle by which four corners were made radii is formed in the outside of the reduced pressure absorption section 12 constituted in this way, and it connects with the reduced pressure absorption section 12 through few inclined planes from the flat drum section 11 of a bottle 10.

[0033] And all the borderlines of the bottom valley line of other reduced pressure absorption sections 12 excluding a frame 23 from having formed the outside ridgelines 15a and 16a of the inclined planes 15 and 16 on either side in the shape of [ with respectively big curvature ] radii, a ridgeline, etc. consist of curves.

[0034] Moreover, such the reduced pressure absorption section 12 is the configuration of point symmetry focusing on the point that the center line of the central longitudinal section and the center line of a midship section cross.

[0035] thus, with the bottle 10 which is the constituted container made of synthetic resin Since the reduced pressure absorption section 12 is formed in the drum section 11, if the negative pressure which produces the heated contents when temperature falls to after [ restoration ] ordinary temperature acts Since the longitudinal-section configuration of the reduced pressure absorption section 12 is made into the curve of the shape of radii with big curvature and the center section is moreover dented most deeply While being able to absorb the effect of reduced pressure, without being able to carry out elastic deformation smoothly compared with the case where a pars basilaris ossis occipitalis is a flat side, and spoiling an appearance, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0036] Moreover, the pars basilaris ossis occipitalis of the reduced pressure absorption section 12 consists of four inclined planes of the inclined planes 15 and 16 on either side and the vertical pars-



basilaris-occipitalis inclined plane 1820. And since the bottom valley lines 21 and 22 used as these boundaries are made into radii and it is made for each other to have touched at the core of the reduced pressure absorption section 12 It can deform smoothly, without the intersection of three inclined planes with the left dextroversion slant faces 15 and 16, the raised bottom section inclined plane 18, or the lower base section inclined plane 20 turning into the point that the motion was restrained, compared with the case of a linear bottom valley line. While being able to absorb the effect of reduced pressure, without spoiling an appearance also by this, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0037] Furthermore, in this reduced pressure absorption section 12, while making the cross-section configuration of the left dextroversion slant faces 15 and 16 into the shape of V character Since the include angle theta is made into 155 degrees, while being able to perform easily mold release from the metal mold at the time of shaping Compared with the case of being flat, the reinforcement to the pressure from the interior is securable, and while being able to absorb the effect of reduced pressure smoothly, without spoiling an appearance to the negative pressure moreover produced inside, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0038] Moreover, in this reduced pressure absorption section 12, while each upper bed ridgeline 17a and 18a of the upside wall inclined plane 17 and the raised bottom section inclined plane 18 is made into convex-like radii Since each soffit ridgeline 19a and 20a of the bottom wall inclined plane 19 and the lower base section inclined plane 20 is made into convex-like radii Compared with the case where it considers as a straight-line-like boundary since the ridgeline of an upper bed and a soffit is mutually formed in the shape of [ of hard flow ] radii, a motion of the upside wall inclined plane 17 and the raised bottom section inclined plane 18, the bottom wall inclined plane 19, and the lower base section inclined plane 20 is smooth. While being able to absorb the effect of reduced pressure smoothly, without spoiling an appearance to the negative pressure produced inside, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0039] Furthermore, since the rectangular frame 23 is formed in that outside and it connects with the reduced pressure absorption section 12 through few inclined planes at this reduced pressure absorption section 12 from the flat drum section 11 While being able to absorb the effect of reduced pressure smoothly, without spoiling an appearance to the negative pressure produced inside in the reduced pressure absorption section 12, securing the buckling strength of a bottle 10, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0040] Moreover, while having formed the outside ridgelines 15a and 16a of the inclined planes 15 and 16 on either side in the shape of [ with respectively big curvature ] radii to the frame 23 Since all the borderlines of the bottom valley line of other reduced pressure absorption sections 12 except a frame 23, a ridgeline, etc. are constituted from a curve While being able to absorb the effect of reduced pressure, without motion of the intersection of the boundary section of each inclined plane or a borderline being hard to be restrained, and spoiling an appearance also by this, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0041] Furthermore, since the reduced pressure absorption section 12 is the configuration of the point symmetry centering on the core (point that the center line of the central longitudinal section and the center line of a midship section cross) While being able to absorb the effect of reduced pressure, without there being no difference in the ease of carrying out of deformation in case negative pressure acts, deforming uniformly, and spoiling an appearance further, even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0042] Next, although drawing 2 explains the gestalt of other 1 operations of the container made of synthetic resin of this invention, the same notation is described about the same part as the gestalt of the already explained operation, and explanation is omitted.

[0043] Drawing 2 starts the gestalt of 1 operation of the container made of synthetic resin of this

invention, and (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[0044] The inclined planes 32 and 33 of right and left of the reduced pressure absorption section 31 dented and formed in a drum section 11 inside consist of bottles 30 which are this container made of synthetic resin in four different inclined planes of the side-attachment-wall section inclined planes 34 and 35 on either side and the pars-basilaris-ossis-occipitalis inclined planes 36 and 37 on either side.

[0045] Each of the borderline is made into the shape of a curve, and these four inclined planes 34-37 consist of radii with big curvature here.

[0046] And the bottom valley lines 38 and 39 which a pars basilaris ossis occipitalis consists of this reduced pressure absorption section 31 in the pars-basilaris-ossis-occipitalis inclined planes 36 and 37 and the vertical pars-basilaris-ossis-occipitalis inclined planes 18 and 20 on either side, and serve as these boundaries A core is made into the configuration which opposed the convex curve mutually like the already explained bottom valley lines 21 and 22, for example, it is made for radii to have touched as radii at the core of the reduced pressure absorption section 31, and is made to be located in the four corners of the reduced pressure absorption section 31 in the ends of radii.

[0047] Moreover, it considers as the configuration of the reverse sense where the borderlines 40 and 41 used as the valley line between the right side-attachment-wall section inclined plane 35 and the right pars-basilaris-ossis-occipitalis inclined plane 37 also face mutually, a core being used as a convex curve, between the left side-attachment-wall section inclined plane 34 and the left pars-basilaris-ossis-occipitalis inclined plane 36. For example, consider as radii, the ends of radii are located in the four corners of the reduced pressure absorption section 31, and it crosses at the same point as the bottom valley lines 38 and 39. Each soffit ridgeline 19a and 20a of each upper bed ridgeline 17a and 18a of the already explained upside wall inclined plane 17 and the raised bottom section inclined plane 18 or the bottom wall inclined plane 19, and the lower base section inclined plane 20 is also crossed at one point of the four corners of the reduced pressure absorption section 31.

[0048] And as the left side-attachment-wall section inclined plane 34, the left pars-basilaris-ossis-occipitalis inclined plane 36 and the right side-attachment-wall section inclined plane 35, and the right pars-basilaris-ossis-occipitalis inclined plane 37 in which it is located on both sides of such borderlines 40 and 41 are shown in drawing 2 (a) and (c), each is mostly made into the same width of face. Deformation by reduced pressure etc. does not take place locally, but it enables it to distribute homogeneity mostly by this.

[0049] Moreover, also in this case, the cross-section configuration was formed in the shape of V character, the center section is dented inside the drum section 11, and, as for the right-and-left pars-basilaris-ossis-occipitalis inclined planes 36 and 37, the include angle theta of a V character part is made into 60 - 175 degrees. Although an include angle is close to about 180 degrees, the side-attachment-wall section inclined planes 34 and 35 of the right and left located in the outside of these right-and-left pars-basilaris-ossis-occipitalis inclined planes 36 and 37 have also been arranged in the shape of [ slight ] V character, and are dented inside the drum section 11.

[0050] Therefore, one inclined plane will be formed between a frame 23 and the reduced pressure absorption section 31, two inclined planes will be formed further in the side-attachment-wall section inclined plane 34 (35) and the pars-basilaris-ossis-occipitalis inclined plane 36 (37), and three inclined planes will be formed in right-and-left both sides across a core, respectively.

[0051] In addition, the configuration of those other than this is the same as that of the bottle 10 which is the container made of synthetic resin already explained by drawing 1.

[0052] Thus, since the same operation effectiveness as the already explained bottle 10 is done so and the reduced pressure absorption section 31 is formed in the drum section 11 also with the bottle 30 which is the constituted container made of synthetic resin If the negative pressure which produces the heated contents when temperature falls to after [ restoration ] ordinary temperature acts, while being able to absorb the effect of reduced pressure, without spoiling an appearance by the smooth elastic deformation of the reduced pressure absorption section 31 Even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0053] Furthermore, in this reduced pressure absorption section 31, since the left side-attachment-wall section inclined plane 34, the left pars-basilaris-ossis-occipitalis inclined plane 36 and the right

side-attachment-wall section inclined plane 35, and the right pars-basilaris-ossis-occipitalis inclined plane 37 are mostly made into the same width of face, deformation by reduced pressure etc. can distribute each inclined plane to homogeneity mostly, and can absorb deformation much more smoothly, and local deformation can be prevented.

[0054] Next, the same notation is described about the same part as the gestalt of the operation of the container made of synthetic resin of this invention already explained although drawing 3 explained the gestalt of other 1 operations further, and explanation is omitted.

[0055] Drawing 3 starts the gestalt of 1 operation of the container made of synthetic resin of this invention, and (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[0056] The inclined planes 52 and 53 of right and left of the reduced pressure absorption section 51 dented and formed in a drum section 11 inside are constituted from a bottle 50 which is this container made of synthetic resin in six different inclined planes of every two side-attachment-wall section inclined planes 54, 54a, 55, and 55a on either side and the pars-basilaris-ossis-occipitalis inclined planes 56 and 57 on either side. It is equivalent to what made the side-attachment-wall section inclined planes 34 and 35 of the right and left explained by drawing 2 two inclined planes which divide into two, respectively and are different.

[0057] This reduced pressure absorption section 51 And between the left side-attachment-wall section inclined plane 54 and left side-attachment-wall section inclined plane 54a, It considers as the configuration of the reverse sense where the borderlines 58 and 59 used as the valley line between the right side-attachment-wall section inclined plane 55 and right side-attachment-wall section inclined plane 55a also face mutually, a core being used as a convex curve. For example, it crosses at the same point as the bottom valley lines 38 and 39 and borderlines 40 and 41 which it considered as radii, and the ends of radii were located in the four corners of the reduced pressure absorption section 51, and were explained by drawing 2 . Each soffit ridgeline 19a and 20a of each upper bed ridgeline 17a and 18a of the upside wall inclined plane 17 already explained by drawing 1 and the raised bottom section inclined plane 18 or the bottom wall inclined plane 19, and the lower base section inclined plane 20 is also crossed at one point of the four corners of the reduced pressure absorption section 51.

[0058] In this reduced pressure absorption section 51, and between the left side-attachment-wall section inclined plane 54 and left side-attachment-wall section inclined plane 54a, Each cross-section configuration between the right side-attachment-wall section inclined plane 55 and right side-attachment-wall section inclined plane 55a was formed in the shape of V character, the center section is dented inside the drum section 11, the cross-section configuration of the right-and-left pars-basilaris-ossis-occipitalis inclined planes 56 and 57 was also formed in the shape of V character, and the center section is dented inside the drum section 11.

[0059] Therefore, one inclined plane is formed between a frame 23 and the reduced pressure absorption section 51, further, two inclined planes will be formed in the side-attachment-wall section inclined planes 54 and 54a (55 55a), one inclined plane will be formed in the pars-basilaris-ossis-occipitalis inclined plane 56 (57), and four inclined planes will be formed in right-and-left both sides across a core, respectively.

[0060] In addition, the configuration of those other than this is the same as that of the bottles 10 and 30 which are the containers made of synthetic resin already explained by drawing 1 and drawing 2 .

[0061] Thus, since the same operation effectiveness as the already explained bottles 10 and 30 is done so and the reduced pressure absorption section 51 is formed in the drum section 11 also with the bottle 50 which is the constituted container made of synthetic resin If the negative pressure which produces the heated contents when temperature falls to after [ restoration ] ordinary temperature acts, while being able to absorb the effect of reduced pressure, without spoiling an appearance by the smooth elastic deformation of the reduced pressure absorption section 51 Even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0062] Furthermore, in this reduced pressure absorption section 51, since the side-attachment-wall section on either side is divided and formed in two side-attachment-wall section inclined planes 54, 54a, 55, and 55a, respectively, deformation by reduced pressure etc. can distribute each inclined plane to homogeneity mostly, and can absorb deformation much more smoothly, and local

deformation can be prevented.

[0063] Moreover, in this reduced pressure absorption section 51, since the side-attachment-wall section on either side is divided and formed in two side-attachment-wall section inclined planes 54, 54a, 55, and 55a, respectively, borderlines 58 and 59 will exist and it becomes easy to secure the reinforcement of the drum section 11 of a bottle 50 by this.

[0064] Next, although drawing 4 explains the gestalt of other 1 operations of the container made of synthetic resin of this invention, the same notation is described about the same part as the gestalt of the already explained operation, and explanation is omitted.

[0065] Central drawing of longitudinal section where drawing 4 started the gestalt of 1 operation of the container made of synthetic resin of this invention, (a) expanded the front view and (b) expanded only a part of reduced pressure absorption section, and (c) are midship sections.

[0066] With the bottle 70 which is this container made of synthetic resin It constitutes from eight different inclined planes of the every three side-attachment-wall section inclined planes 74, 74a, 74b, 75, 75a, and 75b of right and left of the inclined planes 72 and 73 of right and left of the reduced pressure absorption section 71 and two pars-basilaris-ossis-occipitalis inclined planes 76 and 77 of the center of right and left which are dented and formed in a drum section 11 inside. Although it is equivalent, you make it distribute without centralizing the edge of the borderline between each inclined plane on one point of the four corners of the reduced pressure absorption section 71, and make it located in this reduced pressure absorption section 71 by the number of what made the side-attachment-wall section inclined planes 34 and 35 of the right and left explained by drawing 2 three inclined planes which divide into three, respectively and are different, and inclined planes.

[0067] Moreover, the up-and-down pars-basilaris-ossis-occipitalis inclined planes 78 and 79 are arranged between two pars-basilaris-ossis-occipitalis inclined planes 76 and 77 of the center of right and left, and it constitutes from this reduced pressure absorption section 71 on the whole in ten inclined planes.

[0068] And in this reduced pressure absorption section 71, while the edge of the bottom valley lines 80 and 81 mutually made circular [ the reverse sense ] is located in the both ends of upper bed ridgeline 78a of the raised bottom section inclined plane 78 so that it may touch in the core between two pars-basilaris-ossis-occipitalis inclined planes 76 and 77 of the center of right and left, it is located in the both ends of soffit ridgeline 79a of the lower base section inclined plane 79. Moreover, the borderline 82 between the left pars-basilaris-ossis-occipitalis inclined plane 76 and the side-attachment-wall section inclined plane 74 on the left of the outside is located on the outside of the bottom valley line 80 on upside ridgeline 71a of the reduced pressure absorption section 71, and bottom ridgeline 71b. The borderline 83 between the right pars-basilaris-ossis-occipitalis inclined plane 77 and the side-attachment-wall section inclined plane 75 on the right of the outside is symmetrically located with this on the outside of the bottom valley line 81 on upside ridgeline 71a of the reduced pressure absorption section 71, and bottom ridgeline 71b.

[0069] Furthermore, borderline 84a between side-attachment-wall section inclined plane 74a of the borderline 84 between the left side-attachment-wall section inclined plane 74 and side-attachment-wall section inclined plane 74a on the left of the outside and the left and side-attachment-wall section inclined plane 74b on the left of the outside is located in the both ends on left lateral edge line 71c of the reduced pressure absorption section 71. Borderline 85a between side-attachment-wall section inclined plane 75a of the borderline 85 between the right side-attachment-wall section inclined plane 75 and side-attachment-wall section inclined plane 75a on the right of the outside and the right and side-attachment-wall section inclined plane 75b on the right of the outside is symmetrically located in the both ends on 71d of right lateral edge lines of the reduced pressure absorption section 71 with this. In addition, each of these borderlines consists of curves, such as radii convex in a core.

[0070] Moreover, for reinforcement, since an up-and-down inclined plane consists of this reduced pressure absorption section 71 in one inclined plane of only the up-and-down pars-basilaris-ossis-occipitalis inclined planes 78 and 79 unlike the already explained reduced pressure absorption sections 12, 31, and 51, the reinforcement slant faces 86 and 87 constituted from a small inclined plane have been formed in the vertical edge section so that it may expand to drawing 4 (b) and may be shown.

[0071] In addition, the configuration of those other than this is the same as that of the bottles 10, 30,

and 50 which are the containers made of synthetic resin already explained by drawing 1 - drawing 3 .

[0072] Thus, since the same operation effectiveness as the already explained bottles 10, 30, and 50 is done so and the reduced pressure absorption section 71 is formed in the drum section 11 also with the bottle 70 which is the constituted container made of synthetic resin If the negative pressure which produces the heated contents when temperature falls to after [ restoration ] ordinary temperature acts, while being able to absorb the effect of reduced pressure, without spoiling an appearance by the smooth elastic deformation of the reduced pressure absorption section 71 Even if the reduced pressure absorption section 12 once carries out swelling deformation by application of pressure, it is easy to restore to the original condition.

[0073] The side-attachment-wall side on either side is constituted from this reduced pressure absorption section 71 in four inclined planes, respectively. Furthermore, on the left-hand side While having the side-attachment-wall section inclined planes 74, 74a, and 74b and the pars-basilaris-occipitalis inclined plane 76 Since it is easy to move smoothly, without each inclined plane being restrained by reduced pressure etc. since it has distributed without centralizing a borderline on one point and deformation is moreover mostly distributed by homogeneity in each inclined plane, deformation can be absorbed much more smoothly and local deformation can be prevented.

[0074] In addition, although the gestalt of each above-mentioned implementation explained the case where it applied to the PET bottle of a 500ml approximate circle form cross section to the example, it is applicable like containers made of synthetic resin, such as a case of not only this but other volume, and a bottle of other cross-section configurations.

[0075]

[Effect of the Invention] As mentioned above, as concretely explained with the gestalt of 1 operation, according to the container made of synthetic resin of this invention according to claim 1 While denting the reduced pressure absorption section which carries out elastic deformation to the drum section which makes the shape of a cartridge with the reduced pressure produced inside to the drum section inside, arranging more than one to a hoop direction and denting the core of these reduced pressure absorption section most deeply Since the central longitudinal-section configuration of meeting said drum section medial axis of these reduced pressure absorption section was formed in the drum section inside in the shape of [ convex ] a curve by making a core into top-most vertices, there is no part to which it is hard to move a core with the longitudinal-section configuration of the deepest pars basilaris ossis occipitalis by the shape of a curve, and deformation by reduced pressure can be absorbed smoothly.

[0076] Moreover, according to the container made of synthetic resin of this invention according to claim 2, since the reduced pressure absorption section was constituted from at least four vertical and horizontal inclined planes, a core is deepest pars basilaris ossis occipitalis in the shape of a curve, there is no part which is moreover hard to move with the configuration of the reduced pressure absorption section of four inclined planes, and deformation by reduced pressure can be absorbed smoothly.

[0077] Furthermore, according to the container made of synthetic resin of this invention according to claim 3, since the inclined plane on either side was constituted from two or more inclined planes, respectively, deformation by reduced pressure can be absorbed, being able to use smoother deformation as two or more inclined planes as possible for an inclined plane on either side, respectively.

[0078] Moreover, while constituting the pars basilaris ossis occipitalis of the reduced pressure absorption section from said four inclined planes of said reduced pressure absorption section according to the container made of synthetic resin of this invention according to claim 4 Since the bottom valley line used as the boundary of these inclined planes was formed in the shape of [ which opposed two radii ] a curve Compared with a straight-line-like bottom valley line, a bottom valley line moves by having made it the shape of a curve which opposed two radii, the bottom valley line of the boundary of four inclined planes can be smoothly, transformed by it, and deformation by reduced pressure can be absorbed more smoothly.

[0079] Furthermore, since the two each aforementioned inclined plane which constitutes said left dextroversion slant face was mostly made into the same width of face according to the container

made of synthetic resin of this invention according to claim 4, each can be distributed by such inclined plane, it can be made to be able to deform, and deformation by reduced pressure can be absorbed more smoothly.

[0080] Moreover, since two radii of said bottom valley line of the pars basilaris ossis occipitalis of said reduced pressure absorption section were made into the radii which make the center section of the reduced pressure absorption section concerned top-most vertices according to the container made of synthetic resin of this invention according to claim 6, deformation by reduced pressure can be more smoothly absorbed also by such bottom valley line.

[0081] Furthermore, according to the container made of synthetic resin of this invention according to claim 7, since the V character-like pars basilaris ossis occipitalis was formed on said left dextroversion slant face of said reduced pressure absorption section, deformation by reduced pressure can be more smoothly absorbed also by the pars basilaris ossis occipitalis of the shape of such V character.

[0082] Moreover, according to the container made of synthetic resin of this invention according to claim 8, since the include angle of the pars basilaris ossis occipitalis of the shape of V character of said left dextroversion slant face of said reduced pressure absorption section was made into 60 - 175 degrees, if an include angle is too small, it is hard to deform, and if too large, it becomes impossible to make it easy to give an include angle and to transform, and shaping and deformation by reduced pressure can be more smoothly absorbed with the include angle of such range.

[0083] Furthermore, according to the container made of synthetic resin of this invention according to claim 9, since the upper bed ridgeline of said top inclined plane and the soffit ridgeline of said bottom inclined plane were mutually formed in the shape of [ of hard flow ] radii, deformation by reduced pressure can be more smoothly absorbed also with the configuration of such an up-and-down inclined plane.

[0084] Moreover, since according to the container made of synthetic resin of this invention according to claim 10 the borderline of each inclined plane of the reduced pressure absorption section of this frame inside concerned was constituted from a curve while forming the frame in the outside of said reduced pressure absorption section, deformation according the reduced pressure absorption section of such the frame inside to reduced pressure can be more smoothly absorbed only as a curved borderline.

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[Translation done.]



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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] Starting the gestalt of 1 operation of the container made of synthetic resin of this invention, (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[Drawing 2] Starting the gestalt of other 1 operations of the container made of synthetic resin of this invention, (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[Drawing 3] Starting the gestalt of the 1 operation of further others of the container made of synthetic resin of this invention, (a) is [ an A-A sectional view and (c of a front view and (b)) ] B-B sectional views.

[Drawing 4] Central drawing of longitudinal section where the gestalt of 1 operation of the container made of synthetic resin of this invention was started, (a) expanded the front view and (b) expanded only a part of reduced pressure absorption section, and (c) are midship sections.

[Drawing 5] It is the sectional view which cut the left half of the PET bottle equipped with the conventional reduced pressure absorption section.

[Description of Notations]

10, 30, 50, 70 Bottle (container made of synthetic resin)

11 Drum Section

12, 31, 51, 71 Reduced pressure absorption section

13 Central Longitudinal-Section Configuration

14 Core

15, 32, 52, 72 Left inclined plane

15a Outside ridgeline

16, 33, 53, 73 Right inclined plane

16a Outside ridgeline

17 Upside Wall Inclined Plane

17a Upper bed ridgeline

18 78 Up pars-basilaris-ossis-occipitalis inclined plane

18a Upper bed ridgeline

19 Bottom Wall Inclined Plane

19a Soffit ridgeline

20 79 Lower base section inclined plane

20a Soffit ridgeline

21, 38, 80 Left bottom valley line

22, 39, 81 Right bottom valley line

23 Frame

34, 54, 54a, 74, 74a, 74b Left side-attachment-wall section inclined plane

35, 55, 55a, 75, 75a, 75b Right side-attachment-wall section inclined plane

36, 56, 76, 82, 84, 84a Left pars-basilaris-ossis-occipitalis inclined plane

37, 57, 77, 83, 85, 85a Right pars-basilaris-ossis-occipitalis inclined plane

40 58 Left borderline

41 59 Right borderline

86 Upper Reinforcement Slant Face

87 Lower Reinforcement Slant Face

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[Translation done.]



(11)特許出願公開番号

特開2003-63516  
(P2003-63516A)

(43)公開日 平成15年3月5日(2003.3.5)

(51) Int.Cl.<sup>7</sup>

識別記号

F I

テーマコード\* (参考)

**B 6 5 D 1/02**  
**1/40**

B 6 5 D 1/02  
.. 1/40

**B 3 E 0 3 3**

審査請求 未請求 請求項の数10 OL (全 10 頁)

(21)出願番号 特願2001-250207(P2001-250207)

(22)出願日 平成13年8月21日(2001.8.21)

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Fターム(参考) 3E033 AA01 BA18 CA02 CA05 CA07

CA18 DA03 DB01 DC10 DD05

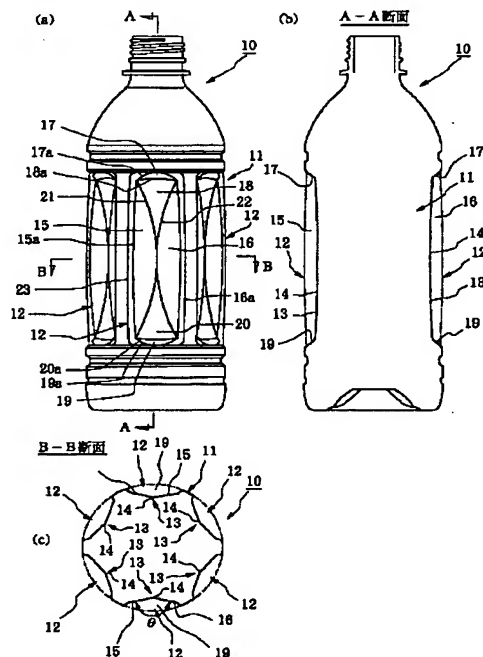
EA04 EA05 EA06 GA02

(54) 【発明の名称】 合成樹脂製容器

(57) 【要約】

【課題】 容器に加わる圧力や減圧力にともなう変形を、外観を損なうことなくスムーズに吸収することができ、軽量化を図る場合にも永久歪みを生じることのない合成樹脂製容器を提供すること。

【解決手段】 上記課題を解決するため合成樹脂製容器の減圧吸収部の形状について種々検討を重ねた結果、平面の角同士や直線同士等がある点に集中して交わることが円滑な動きを妨げることになり、曲面状や曲線状の形状にすることがスムーズな変形の吸収に有効であることを見出し、この発明を完成したもので、その具体的な構成は以下の通りである。筒形状をなす胴部 11 に、内部に生じる減圧により弾性変形する減圧吸収部 12 を胴部 11 の内側に凹ませて周方向に複数配列し、これら減圧吸収部 12 の中心部 14 を最も深く凹ませるとともに、これら減圧吸収部 12 の中央縦断面形状 13 を中心部を頂点として胴部 11 の内側に凸状の曲線状に形成する。これにより、曲線状で中心部が最も深い底部の縦断面形状によって動き難い部分がなく、円滑に減圧による変形を吸収できるようにしている。



## 【特許請求の範囲】

【請求項 1】 筒形状をなす胴部に、内部に生じる減圧により弾性変形する減圧吸収部を胴部内側に凹ませて周方向に複数配列し、これら減圧吸収部の中心部を最も深く凹ませるとともに、これら減圧吸収部の前記胴部中心軸に沿う中央縦断面形状を中心部を頂点として胴部内側に凸状の曲線状に形成してなることを特徴とする合成樹脂製容器。

【請求項 2】 前記減圧吸収部を上下左右の少なくとも 4 つの傾斜面で構成したことを特徴とする請求項 1 記載の合成樹脂製容器。

【請求項 3】 前記左右の傾斜面をそれぞれ 2 つ以上の傾斜面で構成したことを特徴とする請求項 2 記載の合成樹脂製容器。

【請求項 4】 前記減圧吸収部の 4 つの前記傾斜面で減圧吸収部の底部を構成するとともに、これら傾斜面の境界となる底谷線を 2 つの円弧を向かい合わせた曲線状に形成してなることを特徴とする請求項 2 記載の合成樹脂製容器。

【請求項 5】 前記左右傾斜面を構成するそれぞれ 2 つ前記傾斜面をほぼ同一幅としたことを特徴とする請求項 3 記載の合成樹脂製容器。

【請求項 6】 前記減圧吸収部の底部の前記底谷線の 2 つの円弧を当該減圧吸収部の中央部を頂点とする円弧としたことを特徴とする請求項 4 記載の合成樹脂製容器。

【請求項 7】 前記減圧吸収部の前記左右傾斜面で V 字状の底部を形成することを特徴とする請求項 2～6 のいずれかに記載の合成樹脂製容器。

【請求項 8】 前記減圧吸収部の前記左右傾斜面の V 字状の底部の角度を 60～175 度としたことを特徴とする請求項 2～6 のいずれかに記載の合成樹脂製容器。

【請求項 9】 前記上傾斜面の上端稜線と前記下傾斜面の下端稜線を互いに逆方向の円弧状に形成したことを特徴とする請求項 2～8 のいずれかに記載の合成樹脂製容器。

【請求項 10】 前記減圧吸収部の外側に杵状部を形成するとともに、この杵状部内側の当該減圧吸収部の各傾斜面の境界線を曲線で構成したことを特徴とする請求項 1～9 のいずれかに記載の合成樹脂製容器。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、合成樹脂製容器に関し、例えばポリエチレンテレフタレート（PET）のボトル状容器における加熱した内容物の充填後に生じる負圧（減圧）の影響をスムーズに吸収できるようにしたものである。

【0002】

【従来の技術】従来からポリエチレンテレフタレート（PET）などのポリエステル樹脂等を用いて有底のブリフォームを射出成形し、得られたブリフォームを加熱

昇温後、二軸延伸ブロー成形を行ってボトル状容器を製造することが行われており、得られたボトル状容器は、透明性、表面光沢、耐衝撃性、ガスバリア性等に優れ、各種飲料、食品、液体洗剤などの容器として広く使用されている。

【0003】このようなボトル状容器では、内容物の充填にともなう圧力、あるいは加熱した内容物を充填した場合の温度低下に伴なう負圧等が加わっても外観を損ねることがないようにするため、予めボトル状容器の胴部に変形を容易とする部分を形成しておくことが行われており、特に減圧にともなう変形を吸収するための減圧吸収部を形成している。

【0004】このような減圧吸収部としては、例えば特開昭 63-203541 号公報に開示された壘体パネル壁 1 があり、図 5 に示すように、直線状の底線 2 の上下両端に左右斜め方向の谷線 3 を形成し、底線 2 を胴部 4 より陥没させ、この底線 2 の両側の胴部 4 との間の左右の傾斜壁 5、5 部分および谷線 3 の間の上下の傾斜壁 6、6 部分の 4 つの傾斜壁を変形部としている。

【0005】このような変形部により、内部からの加圧力に対しては、陥没している底線 2 が持ち上げられる状態で底線 2 に向かって斜めに形成された傾斜壁 5、5、6、6 が外方に押圧されて膨出変形するようになり、内部が減圧される場合には、膨出変形とは逆に底線 2 が内方に陥没するような形態で傾斜壁 5、5、6、6 を内方に変形させるようにしている。

【0006】

【発明が解決しようとする課題】ところが、このようなパネル壁 1 では、底線 2 の両端が谷線 3 の間の上または下の 1 つの傾斜壁 6、（6）と底線 2 の両側の左右 2 つの傾斜壁 5、5 との 3 つの平面の角が 1 点で接する状態の点となるため、力が加わっても動き難い点であり、加圧や減圧に伴う変形をスムーズに吸収することが出来ない、特に内容物充填に伴う加圧により、減圧吸収部が膨出変形したまま元の状態に復元せず、内容物充填後の減圧をスムーズに吸収することができないという問題がある。

【0007】特に、飲料用のペットボトルなどのボトル状容器では、リサイクル法の施行にともない使用樹脂量の削減や軽量化の要求が高まっており、ボトル状容器の一層の薄肉化を図ろうとする場合に、減圧吸収部がスムーズに変形を吸収しないとボトル状容器に永久歪みが生じ易くなるという問題もある。

【0008】この発明は上記従来技術の有する課題に鑑みてなされたもので、容器に加わる圧力や減圧力にともなう変形を、外観を損なうことなくスムーズに吸収することができ、軽量化を図る場合にも永久歪みを生じることのない合成樹脂製容器を提供しようとするものである。

【0009】

【課題を解決するための手段】上記課題を解決するため合成樹脂製容器の減圧吸収部の形状について種々検討を重ねた結果、平面の角同士や直線同士等がある点に集中して交わることが円滑な動きを妨げることになり、曲面状や曲線状の形状にすることがスムーズな変形の吸収に有効であることを見出し、この発明を完成したもので、その具体的な構成は以下の通りである。

【0010】すなわち、この発明の請求項1記載の合成樹脂製容器は、筒形状をなす胴部に、内部に生じる減圧により弾性変形する減圧吸収部を胴部内側に凹ませて周方向に複数配列し、これら減圧吸収部の中心部を最も深く凹ませるとともに、これら減圧吸収部の前記胴部中心軸に沿う中央縦断面形状を中心部を頂点として胴部内側に凸状の曲線状に形成してなることを特徴とするものであり、曲線状で中心部が最も深い底部の縦断面形状によって動き難い部分がなく、円滑に減圧による変形を吸収できるようにしている。

【0011】また、この発明の請求項2記載の合成樹脂製容器は、請求項1記載の構成に加え、前記減圧吸収部を上下左右の少なくとも4つの傾斜面で構成したことを特徴とするものであり、曲線状で中心部が最も深い底部で、しかも4つの傾斜面の減圧吸収部の形状によって動き難い部分がなく、円滑に減圧による変形を吸収できるようにしている。

【0012】さらに、この発明の請求項3記載の合成樹脂製容器は、請求項2記載の構成に加え、前記左右の傾斜面をそれぞれ2つ以上の傾斜面で構成したことを特徴とするものであり、左右の傾斜面をそれぞれ2つ以上の傾斜面として、より円滑な変形を可能として円滑に減圧による変形を吸収できるようにしている。

【0013】また、この発明の請求項4記載の合成樹脂製容器は、請求項2記載の構成に加え、前記減圧吸収部の4つの前記傾斜面で減圧吸収部の底部を構成するとともに、これら傾斜面の境界となる底谷線を2つの円弧を向かい合わせた曲線状に形成してなることを特徴とするものであり、4つの傾斜面の境界の底谷線を2つの円弧を向かい合わせた曲線状にしてあるので、直線状の底谷線に比べて円滑に底谷線が動いて変形でき、より円滑に減圧による変形が吸収できるようになる。

【0014】さらに、この発明の請求項4記載の合成樹脂製容器は、請求項3記載の構成に加え、前記左右傾斜面を構成するそれぞれ2つ前記傾斜面をほぼ同一幅としたことを特徴とするものであり、このような傾斜面によってそれぞれに分散させて変形させることができ、より円滑に減圧による変形が吸収できるようになる。

【0015】また、この発明の請求項6記載の合成樹脂製容器は、請求項4記載の構成に加え、前記減圧吸収部の底部の前記底谷線の2つの円弧を当該減圧吸収部の中央部を頂点とする円弧としたことを特徴とするものであり、このような底谷線によっても、より円滑に減圧によ

る変形が吸収できるようになる。

【0016】さらに、この発明の請求項7記載の合成樹脂製容器は、請求項2～6のいずれかに記載の構成に加え、前記減圧吸収部の前記左右傾斜面でV字状の底部を形成することを特徴とするものであり、このようなV字状の底部によっても、より円滑に減圧による変形が吸収できるようになる。

【0017】また、この発明の請求項8記載の合成樹脂製容器は、請求項2～6のいずれかに記載の構成に加え、前記減圧吸収部の前記左右傾斜面のV字状の底部の角度を60～175度としたことを特徴とするものであり、角度が小さすぎると成形や変形し難く、大きすぎると角度を付与して変形し易くすることができなくなり、このような範囲の角度によっても、より円滑に減圧による変形が吸収できるようになる。

【0018】さらに、この発明の請求項9記載の合成樹脂製容器は、請求項2～8のいずれかに記載の構成に加え、前記上傾斜面の先端稜線と前記下傾斜面の下端稜線を互いに逆方向の円弧状に形成したことを特徴とするものであり、このような上下の傾斜面の形状によっても、より円滑に減圧による変形が吸収できるようになる。

【0019】また、この発明の請求項10記載の合成樹脂製容器は、請求項1～9のいずれかに記載の構成に加え、前記減圧吸収部の外側に杵状部を形成するとともに、この杵状部内側の当該減圧吸収部の各傾斜面の境界線を曲線で構成したことを特徴とするものであり、このような杵状部内側の減圧吸収部を曲線の境界線だけとして、より円滑に減圧による変形が吸収できるようにしている。

【0020】ここで、減圧吸収部の中心部とは、減圧吸収部の中心および中心近傍をいう。また、減圧吸収部の中央部とは、減圧吸収部の中央および中央近傍をいう。

【0021】さらに、減圧吸収部の底部とは、減圧吸収部の中央縦断面形状の中心部の凸状の曲線を含む傾斜面で構成される底面部分をいい、大きさは異なるとしても左右2つの傾斜面あるいは上下左右の4つの傾斜面で構成される。

【0022】

【発明の実施の形態】以下、この発明の実施の形態について図面に基づき詳細に説明する。図1はこの発明の合成樹脂製容器の一実施の形態にかかり、(a)は正面図、(b)はA-A断面図、(c)はB-B断面図である。

【0023】この合成樹脂製容器10は、例えばポリエチレンテレフタレート(PET)を射出成形することで得られる有底の管状のブリフォームを加熱昇温した後、延伸ブロー成形することで成形されるボトルとされ、胴部11の横断面形状が円形の筒形状に形成されるほか、長方形や多角形等の筒形状に形成される。

【0024】このような合成樹脂製容器であるボトル1

0の胴部11には、加熱した内容物を充填した後の温度低下による負圧を弾性変形により外観を損なうこと無く吸収させるための減圧吸収部12が周方向に複数個、図示例では周方向等間隔に6個形成してある。

【0025】この減圧吸収部12は、ボトル10の胴部11を内側に凹ませて形成してあり、図1(b)に示すように、中央縦断面形状13を中心部14が最も深く凹んだ曲線状に形成してあり、ここでは中央縦断面形状13を曲率半径の大きな円弧で構成し、中心が最も深くなっている。

【0026】また、この減圧吸収部12は左右2つの傾斜面15、16で左右の側壁部と底部が一体として構成されるとともに、上下は側壁部と底部とが異なる傾斜面で構成され、上側壁傾斜面17、上底部傾斜面18、下側壁傾斜面19、下底部傾斜面20の4つの傾斜面で構成されており、ここでは、減圧吸収部12は合計6つの傾斜面で構成されている。

【0027】なお、上下も側壁部と底部を一体として2つの傾斜面で構成するようにすることもでき、これにより、減圧吸収部12は最少限4つの傾斜面で構成することができ、

【0028】そして、この減圧吸収部12では、左右の傾斜面15、16と上下底部傾斜面18、20とで底部が構成され、これらの境界となる底谷線21、22を、中心部が凸状の曲線を互いに向かい合わせた形状としてあり、ここでは、底谷線21、22を円弧とし、減圧吸収部12の中心で円弧が接するようにしてあり、円弧の両端が減圧吸収部12の四隅に位置するようにしてある。

【0029】このような互いに向かい合わせた円弧を介して左右に位置する左右傾斜面15、16は、横断面形状がV字状に形成されて中央部が胴部11の内側に凹んでおり、V字部分の角度 $\theta$ が60～175度としてある。

【0030】このV字部分の角度 $\theta$ が60度より小さいと成形時に金型からの離型が困難となり、175度より大きいと平坦に近くなって内部からの圧力で膨らみ易く強度が低下することから、好ましくは150～165度の範囲であり、ここでは、例えば155度としてある。

【0031】また、上側壁傾斜面17および上底部傾斜面18のそれぞれの上端稜線17a、18aが上に凸状の円弧とされる一方、下側壁傾斜面19および下底部傾斜面20のそれぞれの下端稜線19a、20aが下に凸状の円弧とされ、上端と下端の稜線が互いに逆方向の円弧状に形成されており、減圧吸収部12の四隅に位置する底谷線21、22の端部とこれら稜線の端部が、図1(a)に示すように、1点で交わるようになっている。

【0032】さらに、このように構成した減圧吸収部12の外側には、4隅が円弧とされた矩形の枠状部23が形成されてボトル10の平坦な胴部11からわずかな傾

斜面を介して減圧吸収部12と連結されるようになっている。

【0033】そして、左右の傾斜面15、16の外側稜線15a、16aがそれぞれ曲率の大きな円弧状に形成してあることから、枠状部23を除く他の減圧吸収部12の底谷線や稜線等の全ての境界線が曲線で構成されている。

【0034】また、このような減圧吸収部12は、中央縦断面の中心線と中央横断面の中心線の交差する点を中心として点対称の形状になっている。

【0035】このように構成した合成樹脂製容器であるボトル10では、その胴部11に減圧吸収部12が形成してあるので、加熱した内容物を充填後常温まで温度が低下することによって生じる負圧が作用すると、減圧吸収部12の縦断面形状が曲率の大きな円弧状の曲線としてあり、しかも中央部が最も深く凹ませてあるので、底部が平坦面の場合に比べスムーズに弾性変形することができ、外観を損なうこと無く、減圧の影響を吸収することができるとともに、加圧により減圧吸収部12が一旦膨出変形しても元の状態に復元しやすい。

【0036】また、減圧吸収部12の底部が左右の傾斜面15、16と上下底部傾斜面1820との4つの傾斜面で構成され、しかもこれらの境界となる底谷線21、22を円弧とし、減圧吸収部12の中心で互いが接するようにしてあるので、直線の底谷線の場合に比べ、左右傾斜面15、16と上底部傾斜面18または下底部傾斜面20との3つの傾斜面の交点が動きが拘束された点とならずにスムーズに変形することができ、これによっても外観を損なうこと無く、減圧の影響を吸収することができるとともに、加圧により減圧吸収部12が一旦膨出変形しても元の状態に復元しやすい。

【0037】さらに、この減圧吸収部12では、左右傾斜面15、16の横断面形状をV字状にするとともに、その角度 $\theta$ を155度としてあるので、成形時の金型からの離型が容易にできるとともに、平坦の場合に比べて内部からの圧力に対する強度を確保することができ、しかも内部に生じる負圧に対しては外観を損なうこと無く、減圧の影響をスムーズに吸収することができるとともに、加圧により減圧吸収部12が一旦膨出変形しても元の状態に復元しやすい。

【0038】また、この減圧吸収部12では、上側壁傾斜面17および上底部傾斜面18のそれぞれの上端稜線17a、18aが上に凸状の円弧とされる一方、下側壁傾斜面19および下底部傾斜面20のそれぞれの下端稜線19a、20aが下に凸状の円弧としてあるので、上端と下端の稜線が互いに逆方向の円弧状に形成されることから直線状の境界とする場合に比べ、上側壁傾斜面17および上底部傾斜面18や下側壁傾斜面19および下底部傾斜面20の動きが円滑で、内部に生じる負圧に対しては外観を損なうこと無く、減圧の影響をスムーズに

吸収することができるとともに、加圧により減圧吸収部 12 が一旦膨出変形しても元の状態に復元しやすい。

【0039】さらに、この減圧吸収部 12 には、その外側に矩形的枠状部 23 が形成され、平坦な胴部 11 からわずかな傾斜面を介して減圧吸収部 12 と連結されているので、ボトル 10 の座屈強度を確保しながら、減圧吸収部 12 で内部に生じる負圧に対して外観を損なうことなく、減圧の影響をスムーズに吸収することができるとともに、加圧により減圧吸収部 12 が一旦膨出変形しても元の状態に復元しやすい。

【0040】また、枠状部 23 に対して左右の傾斜面 15、16 の外側稜線 15a、16a がそれぞれ曲率の大きな円弧状に形成してあるとともに、枠状部 23 を除く他の減圧吸収部 12 の底谷線や稜線等の全ての境界線が曲線で構成してあるので、それぞれの傾斜面の境界部や境界線の交点の運動が拘束され難く、これによっても外観を損なうことなく、減圧の影響を吸収することができるとともに、加圧により減圧吸収部 12 が一旦膨出変形しても元の状態に復元しやすい。

【0041】さらに、減圧吸収部 12 がその中心（中央縦断面の中心線と中央横断面の中心線の交差する点）を中心とした点対称の形状になっているので、負圧が作用する場合の変形のし易さに差がなく、一様に変形することになり、一層外観を損なうことなく、減圧の影響を吸収することができるとともに、加圧により減圧吸収部 12 が一旦膨出変形しても元の状態に復元しやすい。

【0042】次に、この発明の合成樹脂製容器の他の一実施の形態について、図 2 により説明するが、既に説明した実施の形態と同一部分については、同一記号を記し、説明は省略する。

【0043】図 2 はこの発明の合成樹脂製容器の一実施の形態にかかり、(a) は正面図、(b) は A-A 断面図、(c) は B-B 断面図である。

【0044】この合成樹脂製容器であるボトル 30 では、胴部 11 に内側に凹ませて形成する減圧吸収部 31 の左右の傾斜面 32、33 が左右の側壁部傾斜面 34、35 と左右の底部傾斜面 36、37 との異なる 4 つの傾斜面で構成してある。

【0045】これら 4 つの傾斜面 34~37 は、その境界線がいずれも曲線状とされ、ここでは曲率の大きな円弧で構成されている。

【0046】そして、この減圧吸収部 31 では、左右の底部傾斜面 36、37 と上下底部傾斜面 18、20 とで底部が構成され、これらの境界となる底谷線 38、39 は、既に説明した底谷線 21、22 と同様に、中心部が凸状の曲線を互いに向かい合わせた形状とされ、例えば円弧として減圧吸収部 31 の中心で円弧が接するようにしてあり、円弧の両端が減圧吸収部 31 の四隅に位置するようにしてある。

【0047】また、左の側壁部傾斜面 34 と左の底部傾

斜面 36 との間、右の側壁部傾斜面 35 と右の底部傾斜面 37 との間の谷線となる境界線 40、41 も中心部が凸状の曲線とされて互いに向かい合う逆向きの形状とされ、例えば円弧とされて円弧の両端が減圧吸収部 31 の四隅に位置し、底谷線 38、39 と同一の点で交差するようになっており、既に説明した上側壁傾斜面 17 および上底部傾斜面 18 のそれぞれの上端稜線 17a、18a、あるいは下側壁傾斜面 19 および下底部傾斜面 20 のそれぞれの下端稜線 19a、20a と減圧吸収部 31 の四隅の 1 点で交わるようになっている。

【0048】そして、このような境界線 40、41 を挟んで位置する左の側壁部傾斜面 34 と左の底部傾斜面 36、右の側壁部傾斜面 35 と右の底部傾斜面 37 は、図 2 (a)、(c) に示すように、それぞれがほぼ同一幅としてある。これにより、減圧などによる変形が局部的に起こらずほぼ均一に分散させることができるようにしている。

【0049】また、この場合にも左右底部傾斜面 36、37 は横断面形状が V 字状に形成されて中央部が胴部 11 の内側に凹んでおり、V 字部分の角度  $\theta$  が 60~175 度としてある。これら左右底部傾斜面 36、37 の外側に位置する左右の側壁部傾斜面 34、35 も角度はほぼ 180 度に近いがわずかな V 字状に配置されて胴部 11 の内側に凹んでいる。

【0050】したがって、枠状部 23 と減圧吸収部 31 との間で 1 つの傾斜面が形成され、さらに側壁部傾斜面 34 (35) と底部傾斜面 36 (37) で 2 つの傾斜面が形成され、中心部を挟んで左右両側にそれぞれ 3 つの傾斜面が形成されることになる。

【0051】なお、これ以外の構成は、既に図 1 で説明した合成樹脂製容器であるボトル 10 と同一である。

【0052】このように構成した合成樹脂製容器であるボトル 30 によっても既に説明したボトル 10 と同一の作用効果を奏し、その胴部 11 に減圧吸収部 31 が形成してあるので、加熱した内容物を充填後常温まで温度が低下することによって生じる負圧が作用すると、減圧吸収部 31 のスムーズな弾性変形によって外観を損なうことなく、減圧の影響を吸収することができるとともに、加圧により減圧吸収部 12 が一旦膨出変形しても元の状態に復元しやすい。

【0053】さらに、この減圧吸収部 31 では、左の側壁部傾斜面 34 と左の底部傾斜面 36、右の側壁部傾斜面 35 と右の底部傾斜面 37 がほぼ同一幅としてあるので、減圧などによる変形がそれぞれの傾斜面にほぼ均一に分散させることができ、一層スムーズに変形を吸収することができ、局部的な変形を防止することができる。

【0054】次に、この発明の合成樹脂製容器のさらに他の一実施の形態について、図 3 により説明するが、既に説明した実施の形態と同一部分については、同一記号を記し、説明は省略する。

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【0055】図3はこの発明の合成樹脂製容器の一実施の形態にかかり、(a)は正面図、(b)はA-A断面図、(c)はB-B断面図である。

【0056】この合成樹脂製容器であるボトル50では、胴部11に内側に凹ませて形成する減圧吸収部51の左右の傾斜面52、53が左右の2つずつの側壁部傾斜面54、54a、55、55aと左右の底部傾斜面56、57との異なる6つの傾斜面で構成しており、図2で説明した左右の側壁部傾斜面34、35をそれぞれ2つに分割して異なる2つの傾斜面としたものと同等である。

【0057】そして、この減圧吸収部51でも左の側壁部傾斜面54と左の側壁部傾斜面54aとの間、右の側壁部傾斜面55と右の側壁部傾斜面55aとの間の谷線となる境界線58、59も中心部が凸状の曲線とされて互いに向かい合う逆向きの形状とされ、例えば円弧とされて円弧の両端が減圧吸収部51の四隅に位置し、図2で説明した底谷線38、39および境界線40、41と同一の点で交差するようになっており、図1で既に説明した上側壁傾斜面17および上底部傾斜面18のそれぞれの上端稜線17a、18a、あるいは下側壁傾斜面19および下底部傾斜面20のそれぞれの下端稜線19a、20aとも減圧吸収部51の四隅の1点で交わるようになっている。

【0058】そして、この減圧吸収部51では、左の側壁部傾斜面54と左の側壁部傾斜面54aとの間、右の側壁部傾斜面55と右の側壁部傾斜面55aとの間のそれぞれの横断面形状がV字状に形成されて中央部が胴部11の内側に凹んでおり、左右底部傾斜面56、57の横断面形状もV字状に形成されて中央部が胴部11の内側に凹んでいる。

【0059】したがって、杵状部23と減圧吸収部51との間で1つの傾斜面が形成され、さらに側壁部傾斜面54、54a(55、55a)で2つの傾斜面が、底部傾斜面56(57)で1つの傾斜面が形成され、中心部を挟んで左右両側にそれぞれ4つの傾斜面が形成されることになる。

【0060】なお、これ以外の構成は、既に図1及び図2で説明した合成樹脂製容器であるボトル10、30と同一である。

【0061】このように構成した合成樹脂製容器であるボトル50によっても既に説明したボトル10、30と同一の作用効果を奏し、その胴部11に減圧吸収部51が形成してあるので、加熱した内容物を充填後常温まで温度が低下することによって生じる負圧が作用すると、減圧吸収部51のスムーズな弾性変形によって外観を損なうことなく、減圧の影響を吸収することができるとともに、加圧により減圧吸収部12が一旦膨出変形しても元の状態に復元しやすい。

【0062】さらに、この減圧吸収部51では、左右の

側壁部がそれぞれ2つの側壁部傾斜面54、54a、55、55aに分割して形成してあるので、減圧などによる変形がそれぞれの傾斜面にはほぼ均一に分散させることができ、一層スムーズに変形を吸収することができ、局部的な変形を防止することができる。

【0063】また、この減圧吸収部51では、左右の側壁部がそれぞれ2つの側壁部傾斜面54、54a、55、55aに分割して形成してあるので、境界線58、59が存在することになり、これによってボトル50の胴部11の強度を確保することが容易となる。

【0064】次に、この発明の合成樹脂製容器の他の一実施の形態について、図4により説明するが、既に説明した実施の形態と同一部分については、同一記号を記し、説明は省略する。

【0065】図4はこの発明の合成樹脂製容器の一実施の形態にかかり、(a)は正面図、(b)は減圧吸収部51のみの一部を拡大した中央縦断面図、(c)は中央横断面図である。

【0066】この合成樹脂製容器であるボトル70では、胴部11に内側に凹ませて形成する減圧吸収部71の左右の傾斜面72、73が左右の3つずつの側壁部傾斜面74、74a、74b、75、75a、75bと左右中央の2つの底部傾斜面76、77との異なる8つの傾斜面で構成しており、図2で説明した左右の側壁部傾斜面34、35をそれぞれ3つに分割して異なる3つの傾斜面としたものと傾斜面の数で同等であるが、この減圧吸収部71では、各傾斜面の間の境界線の端部を減圧吸収部71の四隅の1点に集中させずに分散させて位置させてある。

【0067】また、この減圧吸収部71では、左右中央の2つの底部傾斜面76、77の間に上下の底部傾斜面78、79が配置されており、全体で10個の傾斜面で構成してある。

【0068】そして、この減圧吸収部71では、左右中央の2つの底部傾斜面76、77の間の中心部で接するように互いに逆向きの円弧状とされた底谷線80、81の端部が上底部傾斜面78の上端稜線78aの両端部に位置するとともに、下底部傾斜面79の下端稜線79aの両端部に位置している。また、左の底部傾斜面76とその外側の左の側壁部傾斜面74との間の境界線82が底谷線80の外側で減圧吸収部71の上側稜線71aと下側稜線71b上に位置し、これと対称に右の底部傾斜面77とその外側の右の側壁部傾斜面75との間の境界線83が底谷線81の外側で減圧吸収部71の上側稜線71aと下側稜線71b上に位置している。

【0069】さらに、左の側壁部傾斜面74とその外側の左の側壁部傾斜面74aとの間の境界線84および左の側壁部傾斜面74aとその外側の左の側壁部傾斜面74bとの間の境界線84aは減圧吸収部71の左側稜線71c上の両端部に位置し、これと対称に右の側壁部傾



斜面75とその外側の右の側壁部傾斜面75aとの間の境界線85および右の側壁部傾斜面75aとその外側の右の側壁部傾斜面75bとの間の境界線85aは減圧吸収部71の右側稜線71d上の両端部に位置している。なお、これら境界線はいずれも中心部が凸状の円弧等の曲線で構成されている。

【0070】また、この減圧吸収部71では、既に説明した減圧吸収部12, 31, 51と異なり、上下の傾斜面が上下の底部傾斜面78, 79だけの1つの傾斜面で構成されることから、補強のため、図4(b)に拡大して示すように、上下端縁部に小さな傾斜面で構成した補強斜面86, 87が形成してある。

【0071】なお、これ以外の構成は、既に図1～図3で説明した合成樹脂製容器であるボトル10, 30, 50と同一である。

【0072】このように構成した合成樹脂製容器であるボトル70によっても既に説明したボトル10, 30, 50と同一の作用効果を奏し、その胴部11に減圧吸収部71が形成してあるので、加熱した内容物を充填後常温まで温度が低下することによって生じる負圧が作用すると、減圧吸収部71のスムーズな弾性変形によって外観を損なうことなく、減圧の影響を吸収することができる。加圧により減圧吸収部12が一旦膨出変形しても元の状態に復元しやすい。

【0073】さらに、この減圧吸収部71では、左右の側壁面がそれぞれ4つの傾斜面で構成してあり、例えば左側では、側壁部傾斜面74, 74a, 74bと底部傾斜面76を備えるとともに、境界線を1点に集中させずに分散してあるので、減圧などによりそれぞれの傾斜面が拘束されずにスムーズに動き易く、しかも変形がそれぞれの傾斜面にほぼ均一に分散されるので、一層スムーズに変形を吸収することができ、局所的な変形を防止することができる。

【0074】なお、上記各実施の形態では、500mlの略円形断面のペットボトルに適用する場合を例に説明したが、これに限らず、他の容積の場合や他の断面形状のボトル等の合成樹脂製容器に同様に適用することができる。

【0075】

【発明の効果】以上、一実施の形態とともに具体的に説明したようにこの発明の請求項1記載の合成樹脂製容器によれば、筒形状をなす胴部に、内部に生じる減圧により弾性変形する減圧吸収部を胴部内側に凹ませて周方向に複数配列し、これら減圧吸収部の中心部を最も深く凹ませるとともに、これら減圧吸収部の前記胴部中心軸に沿う中央縦断面形状を中心部を頂点として胴部内側に凸状の曲線状に形成したので、曲線状で中心部が最も深い底部の縦断面形状によって動き難い部分がなく、円滑に減圧による変形を吸収することができる。

【0076】また、この発明の請求項2記載の合成樹脂

製容器によれば、減圧吸収部を上下左右の少なくとも4つの傾斜面で構成したので、曲線状で中心部が最も深い底部で、しかも4つの傾斜面の減圧吸収部の形状によって動き難い部分がなく、円滑に減圧による変形を吸収することができる。

【0077】さらに、この発明の請求項3記載の合成樹脂製容器によれば、左右の傾斜面をそれぞれ2つ以上の傾斜面で構成したので、左右の傾斜面をそれぞれ2つ以上の傾斜面として、より円滑な変形を可能として減圧による変形を吸収することができる。

【0078】また、この発明の請求項4記載の合成樹脂製容器によれば、前記減圧吸収部の4つの前記傾斜面で減圧吸収部の底部を構成するとともに、これら傾斜面の境界となる底谷線を2つの円弧を向かい合わせた曲線状に形成したので、4つの傾斜面の境界の底谷線を2つの円弧を向かい合わせた曲線状にしたことで、直線状の底谷線に比べて円滑に底谷線が動いて変形でき、より円滑に減圧による変形を吸収することができる。

【0079】さらに、この発明の請求項4記載の合成樹脂製容器によれば、前記左右傾斜面を構成するそれぞれ2つ前記傾斜面をほぼ同一幅としたので、このような傾斜面によってそれぞれに分散させて変形させることができ、より円滑に減圧による変形を吸収することができる。

【0080】また、この発明の請求項6記載の合成樹脂製容器によれば、前記減圧吸収部の底部の前記底谷線の2つの円弧を当該減圧吸収部の中央部を頂点とする円弧としたので、このような底谷線によっても、より円滑に減圧による変形を吸収することができる。

【0081】さらに、この発明の請求項7記載の合成樹脂製容器によれば、前記減圧吸収部の前記左右傾斜面でV字状の底部を形成したので、このようなV字状の底部によっても、より円滑に減圧による変形を吸収することができる。

【0082】また、この発明の請求項8記載の合成樹脂製容器によれば、前記減圧吸収部の前記左右傾斜面のV字状の底部の角度を60～175度としたので、角度が小さすぎると成形や変形し難く、大きすぎると角度を付与して変形し易くすることができなくなり、このような範囲の角度によって、より円滑に減圧による変形を吸収することができる。

【0083】さらに、この発明の請求項9記載の合成樹脂製容器によれば、前記上傾斜面の上端稜線と前記下傾斜面の下端稜線を互いに逆方向の円弧状に形成したので、このような上下の傾斜面の形状によっても、より円滑に減圧による変形を吸収することができる。

【0084】また、この発明の請求項10記載の合成樹脂製容器によれば、前記減圧吸収部の外側に杵状部を形成するとともに、この杵状部内側の当該減圧吸収部の各傾斜面の境界線を曲線で構成したので、このような杵状

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部内側の減圧吸収部を曲線の境界線だけとして、より円滑に減圧による変形を吸収することができる。

【図面の簡単な説明】

【図1】この発明の合成樹脂製容器の一実施の形態にかかり、(a)は正面図、(b)はA-A断面図、(c)はB-B断面図である。

【図2】この発明の合成樹脂製容器の他の一実施の形態にかかり、(a)は正面図、(b)はA-A断面図、(c)はB-B断面図である。

【図3】この発明の合成樹脂製容器のさらに他の一実施の形態にかかり、(a)は正面図、(b)はA-A断面図、(c)はB-B断面図である。

【図4】この発明の合成樹脂製容器の一実施の形態にかかり、(a)は正面図、(b)は減圧吸収部のみの一部を拡大した中央縦断面図、(c)は中央横断面図である。

【図5】従来の減圧吸収部を備えたペットボトルの左半分を切断した断面図である。

【符号の説明】

10, 30, 50, 70 ボトル(合成樹脂製容器)  
11 胴部  
12, 31, 51, 71 減圧吸収部  
13 中央縦断面形状  
14 中心部  
15, 32, 52, 72 左の傾斜面  
15a 外側稜線

\* 16, 33, 53, 73 右の傾斜面

16a 外側稜線

17 上側壁部傾斜面

17a 上端稜線

18, 78 上底部傾斜面

18a 上端稜線

19 下側壁部傾斜面

19a 下端稜線

20, 79 下底部傾斜面

20a 下端稜線

21, 38, 80 左の底谷線

22, 39, 81 右の底谷線

23 杵状部

34, 54, 54a, 74, 74a, 74b 左の側壁部傾斜面

35, 55, 55a, 75, 75a, 75b 右の側壁部傾斜面

36, 56, 76, 82, 84, 84a 左の底部傾斜面

37, 57, 77, 83, 85, 85a 右の底部傾斜面

40, 58 左の境界線

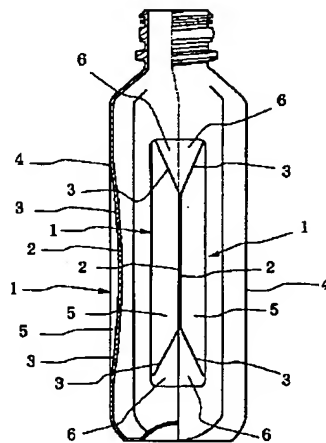
41, 59 右の境界線

86 上の補強斜面

87 下の補強斜面

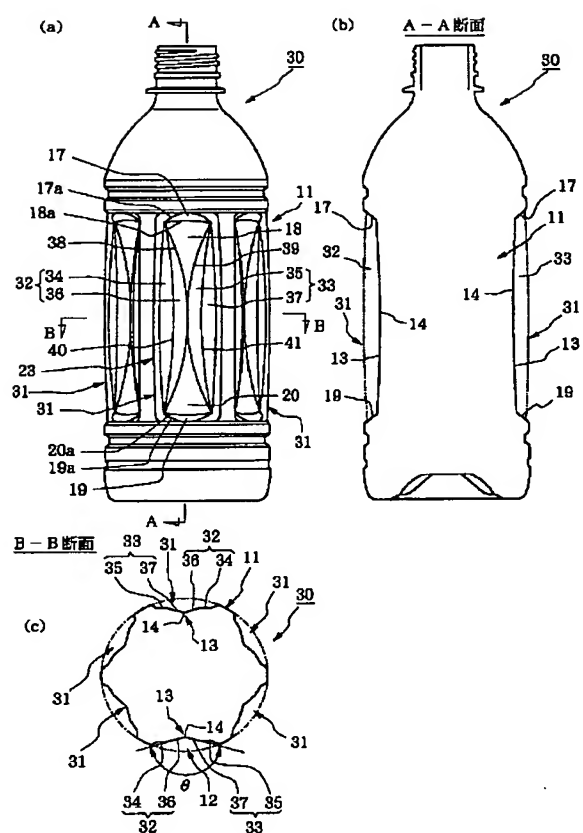
\*

【図5】

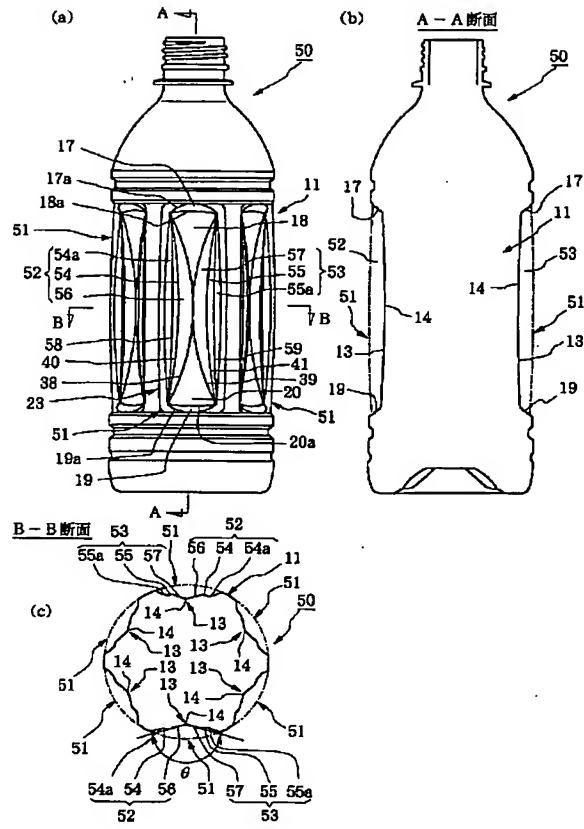




【圖2】



【図3】



【図4】

